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Deposited in DRO:

07 February 2019

Version of attached file:

Published Version

Peer-review status of attached file:

Unknown

Citation for published item:

Cramman, Helen and Kind, Vanessa and Lyth, Andrew and Gray, Helen and Younger, Kirsty and Gemar, Adam and Eerola, Paivi and Coe, Rob and Kind, Per (2019) 'Monitoring practical science in schools and colleges.', Project Report. Durham University, Durham.

Further information on publisher's website:

<https://www.dur.ac.uk/research/directory/view/?mode=projectid=934>

Publisher's copyright statement:

Prepared for the Gatsby Charitable Foundation and the Wellcome Trust.

Additional information:

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Monitoring practical science in schools and colleges

Appendix 6: Higher Education Staff Survey

Durham University

Prepared for the Gatsby Charitable Foundation and the Wellcome Trust

**Helen Cramman, Vanessa Kind, Andrew Lyth, Helen Gray, Kirsty Younger,
Adam Gemar, Paivi Eerola, Rob Coe, Per Kind**

Publication date: January 2019

Version 1.0

1 Contents

1	Contents.....	2
2	Higher Education staff survey – Year 1	3
3	Higher Education staff survey – Year 2	15
4	Higher Education staff survey – Year 3	29

2 Higher Education staff survey – Year 1

About you

Please note that questions in bold with a * are compulsory.

1. Your first name

2. Your last name

***3. Name of university (*Required)**

***4. In which nation is your University? (*Required)**

Select one.

<input type="radio"/>	England
<input type="radio"/>	Northern Ireland
<input type="radio"/>	Scotland
<input type="radio"/>	Wales

***5. Which department(s) do you teach in? (Select all the options which apply) (*Required)**

Select all that apply.

<input type="checkbox"/>	Biological Science (including Life Sciences, Plant Biology and Animal Sciences)
<input type="checkbox"/>	Chemistry
<input type="checkbox"/>	Physics (including Astronomy)
<input type="checkbox"/>	Other:
	<input type="text"/>

***6. What is your role within the department? (Select all that apply) (*Required)**

Select at least 1 choices.

<input type="checkbox"/>	First year undergraduate laboratory coordinator
<input type="checkbox"/>	First year undergraduate course director
<input type="checkbox"/>	Laboratory demonstrator (academic member of staff e.g. lecturer, teaching fellow, PDRA)
<input type="checkbox"/>	Admission tutor
<input type="checkbox"/>	Other:
	<input type="text"/>

7. For how many years have you taught undergraduate students?

Enter a number (Minimum 0, Maximum 60).

years

About your department

What are the standard entry requirements for undergraduates to study a single honours science degree in your department?

8. Grades / UCAS points tariff required (e.g. SQA Highers: AAAA, A Levels: AAA, IB: 37 points with 655 at HL)

9. Subjects required (e.g. Grade A in Mathematics, Advanced Higher in Biology etc.)

10. Have the entry requirements changed over the last five years? (Select one option)

Select one.

<input type="radio"/>	Increased
<input type="radio"/>	Decreased
<input type="radio"/>	Stayed the same
<input type="radio"/>	Don't know
<input type="radio"/>	Other:
	<input type="text"/>

11. Do you currently take account of applicants' Extended Project Qualifications (EPQ) or CREST Award/Nuffield Research Placement experience in your entry requirements?

Select one.

<input type="radio"/>	Yes
<input type="radio"/>	No
<input type="radio"/>	Don't know

12. Do you currently assume that a good grade in A Levels, SQA Highers, IB (or equivalent) reflects a level of practical skill which will enable the student to fully access the course for which s/he has applied?

Select one.

<input type="radio"/>	Yes
<input type="radio"/>	No
<input type="radio"/>	Don't know

13. Will you be requiring a pass in a practical endorsement alongside any science A Levels, SQA Highers, IB (or equivalent) as part of your offers in the future?

Select one.

<input type="radio"/>	Yes	(Answer question number 13.1.)
<input type="radio"/>	No	
<input type="radio"/>	Don't know	

13.1 If yes, please provide details

Undergraduate skills

14. Over the last five years, how has your new UK undergraduates' level of laboratory skills changed? By 'laboratory skills' we are referring to the ability to work with apparatus effectively. We do not include experimental planning or data analysis etc. in this definition. (Select one option)

Select one.

<input type="radio"/>	Improved	(Answer question number 14.1.)
<input type="radio"/>	Stayed about the same	(Answer question number 14.1.)
<input type="radio"/>	Declined	(Answer question number 14.1.)
<input type="radio"/>	Don't know	(Answer question number 14.1.)

14.1 Comments

15. Over the last five years, how has your new UK undergraduates' ability to plan experiments in the laboratory changed? (Select one option)

Select one.

<input type="radio"/>	Improved	(Answer question number 15.1.)
<input type="radio"/>	Stayed about the same	(Answer question number 15.1.)
<input type="radio"/>	Declined	(Answer question number 15.1.)
<input type="radio"/>	Don't know	(Answer question number 15.1.)

15.1 Comments

16. Over the last five years, how has your new UK undergraduates' ability to work independently in the laboratory changed? (Select one option)

Select one.

<input type="radio"/>	Improved	(Answer question number 16.1.)
<input type="radio"/>	Stayed about the same	(Answer question number 16.1.)
<input type="radio"/>	Declined	(Answer question number 16.1.)
<input type="radio"/>	Don't know	(Answer question number 16.1.)

16.1 Comments

17. Over the last five years, how has your new UK undergraduates' level of knowledge changed? By 'knowledge' we are referring to familiarity with different topic areas within your subject. (Select one option)

Select one.

<input type="radio"/>	Improved	(Answer question number 17.1.)
<input type="radio"/>	Stayed about the same	(Answer question number 17.1.)
<input type="radio"/>	Declined	(Answer question number 17.1.)
<input type="radio"/>	Don't know	(Answer question number 17.1.)

17.1 Comments

18. Over the last five years, how has your new UK undergraduates' level of understanding changed? By 'understanding' we are referring to a deeper grasp of concepts and processes, rather than a recall of facts. (Select one option)

Select one.

<input type="radio"/>	Improved	(Answer question number 18.1.)
<input type="radio"/>	Stayed about the same	(Answer question number 18.1.)
<input type="radio"/>	Declined	(Answer question number 18.1.)
<input type="radio"/>	Don't know	(Answer question number 18.1.)

18.1 Comments

19. In which of the areas mentioned above has the greatest positive and negative change occurred?

Select one per row.

	<i>Greatest negative change</i>	<i>Greatest positive change</i>	<i>No change</i>	<i>Don't know</i>
New undergraduates' laboratory skills	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
New undergraduates' ability to plan experiments	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
New undergraduates' ability to work independently	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
New undergraduates' level of knowledge	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
New undergraduates' understanding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

20. How important do you think it is for new UK undergraduates to have any of these skills on entry to a university science degree? (Select one option per row)

Select one per row.

	<i>Very unimportant</i>	<i>Quite unimportant</i>	<i>Neither important nor unimportant</i>	<i>Quite important</i>	<i>Very important</i>
Confidence to work in a science laboratory	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Confidence to undertake experiments in an outdoor context	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to solve problems independently in a practical context	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to follow laboratory instructions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to understand laboratory and/or fieldwork instructions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to understand the theory behind the scientific method	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Competence in scientific methods and practices, specifically: Planning experiments	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Competence in scientific methods and practices, specifically: Use of scientific equipment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Competence in scientific methods and practices, specifically: Time management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Competence in scientific methods and practices, specifically: Note-taking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Competence in scientific methods and practices, specifically: Scientific report-writing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to use mathematical concepts and skills in a practical context, for example, for data analysis	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to follow laboratory Health and Safety regulations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to use IT tools in the laboratory or in the field, e.g. for making measurements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to use IT tools for analysing and presenting data obtained in own experiments	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Communication, team-working and presentation skills when working in a laboratory or in the field	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to use specialist laboratory and/or fieldwork equipment e.g. glassware in chemistry, an oscilloscope in physics or a microscope in biology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to apply specialist methods and techniques when carrying out experiments or fieldwork	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

20.1 Please add any important skills missed off this list, or explain any skills you find particularly important

21. How well do you think your most recent new UK undergraduates come prepared in these specific skill areas? (Select one option per row)

Select one per row.

	<i>Generally well prepared</i>	<i>Generally have some capability</i>	<i>Generally poorly prepared</i>	<i>Don't know</i>
Confidence to work in a science laboratory	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Confidence to undertake experiments in an outdoor context	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to solve problems independently in a practical context	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to follow laboratory instructions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to understand laboratory and/or fieldwork instructions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to understand the theory behind the scientific method	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Competence in scientific methods and practices, specifically: Planning experiments	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Competence in scientific methods and practices, specifically: Use of scientific equipment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Competence in scientific methods and practices, specifically: Time management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Competence in scientific methods and practices, specifically: Note-taking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Competence in scientific methods and practices, specifically: Scientific report-writing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Ability to use mathematical concepts and skills in a practical context, for example, for data analysis	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to follow laboratory Health and Safety regulations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to use IT tools in the laboratory or in the field, e.g. for making measurements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to use IT tools for analysing and presenting data obtained in own experiments	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Communication, team-working and presentation skills when working in a laboratory or in the field	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to use specialist laboratory and/or fieldwork equipment e.g. glassware in chemistry, an oscilloscope in physics or a microscope in biology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to apply specialist methods and techniques when carrying out experiments or fieldwork	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

21.1 Please add any important skills missed off this list, or explain any skills you find particularly important

22. Has your undergraduate laboratory-based teaching changed over the past 5 years in response to the practical work skills of incoming undergraduates?

Select one.

<input type="radio"/>	Yes	(Answer question number 22.1.)
<input type="radio"/>	No	

22.1 If yes, please select all options that apply

Select all that apply.

<input type="checkbox"/>	Reduced the number of laboratory experiments
<input type="checkbox"/>	Increased the number of laboratory experiments
<input type="checkbox"/>	Removed more complex experiments
<input type="checkbox"/>	Introduced more complex experiments
<input type="checkbox"/>	Included more detailed instructions on basic techniques
<input type="checkbox"/>	Reduced instructions on basic techniques
<input type="checkbox"/>	Changed curriculum content
<input type="checkbox"/>	Other: <div></div>

23. Please use the space below if you have any additional comments you would like to add about any aspect of this survey or about practical science in general.

24. As part of the study we would like to undertake brief telephone interviews with some respondents. Please indicate below if you would be happy to participate.

Select all that apply.

- | | | |
|--------------------------|---|--------------------------------|
| <input type="checkbox"/> | Yes, I agree to participate in a brief telephone interview, if selected | (Answer question number 24.1.) |
| <input type="checkbox"/> | No, I do not wish to participate in a brief telephone interview | |

24.1 If yes, please include your name and email address below

25. As part of the study we would like to distribute a survey to some undergraduate students. Please indicate below if you would be happy to participate.

Select one.

- | | | |
|-----------------------|--|--------------------------------|
| <input type="radio"/> | Yes, I agree to distribute the student survey, if selected | (Answer question number 25.1.) |
| <input type="radio"/> | No, I do not wish to distribute the student survey | |

25.1 If yes, please include your name and email address below.

3 Higher Education staff survey – Year 2

About you

Please note that questions in bold with a * are compulsory.

1. Your first name

2. Your last name

***3. Name of university (*Required)**

***4. In which nation is your University? (*Required)**

Select one.

<input type="radio"/>	England
<input type="radio"/>	Northern Ireland
<input type="radio"/>	Scotland
<input type="radio"/>	Wales

***5. In which department(s) do you teach? (Select all applicable options) (*Required)**

Select all that apply.

<input type="checkbox"/>	Biological Science (including Life Sciences, Plant Biology and Animal Sciences)
<input type="checkbox"/>	Chemistry
<input type="checkbox"/>	Physics (including Astronomy)
<input type="checkbox"/>	Other:
	<input type="text"/>

***6. What is your role within the department in which you work for the largest proportion of your working week? (Select all that apply) (*Required)**

Select at least 1 choices.

<input type="checkbox"/>	First year undergraduate laboratory coordinator
<input type="checkbox"/>	First year undergraduate course director
<input type="checkbox"/>	Laboratory demonstrator (academic member of staff e.g. lecturer, teaching fellow, PDRA)
<input type="checkbox"/>	Admissions tutor
<input type="checkbox"/>	Other:
	<input type="text"/>

7. For how many years have you taught undergraduate students?

Enter a number (Minimum 0, Maximum 60).

years

About your department

What are the standard entry requirements for undergraduates to study a single honours science degree in your department?

8. Grades / UCAS points tariff required (for entry in Autumn 2016) (e.g. SQA Highers: AAAA, A Levels: AAA, IB: 37 points with 655 at HL)

9. Subjects required (e.g. Grade A in Mathematics, Advanced Higher in Biology etc.)

10. Have entry requirements changed over the last five years? (Select one option)

Select one.

<input type="radio"/>	Increased
<input type="radio"/>	Decreased
<input type="radio"/>	Stayed the same
<input type="radio"/>	Don't know
<input type="radio"/>	Other:
	<input type="text"/>

11. Do you currently take account of applicants' Extended Project Qualifications (EPQ) or CREST Award/Nuffield Research Placement experience in your entry requirements?

Select one.

<input type="radio"/>	Yes
<input type="radio"/>	No
<input type="radio"/>	Don't know

12. Do you currently assume that a good grade in A Levels, SQA Highers, IB (or equivalent) reflects a level of practical skill, which will enable the student to fully access the course for which s/he has applied?

Select one.

<input type="radio"/>	Yes
<input type="radio"/>	No
<input type="radio"/>	Don't know

13. Do you require a pass in a practical endorsement as part of your offers alongside science A Levels, SQA Highers, IB (or equivalent) grades?

Select one.

<input type="radio"/>	Yes	(Answer question number 13.1.)
<input type="radio"/>	No	
<input type="radio"/>	Don't know	

13.1 If yes, please provide details

Undergraduate skills

14. Over the last year, how has your first year UK-educated undergraduates' level of laboratory skills changed? By 'laboratory skills' we are referring to their ability to work with apparatus effectively. Experiment planning, data analysis and simulations should be excluded. (Select one option)

Select one.

<input type="radio"/>	Improved	(Answer question number 14.1.)
<input type="radio"/>	Stayed about the same	(Answer question number 14.1.)
<input type="radio"/>	Declined	(Answer question number 14.1.)
<input type="radio"/>	Don't know	(Answer question number 14.1.)

14.1 Comments

15. Over the last year, how has your new first year UK-educated undergraduates' ability to plan experiments in the laboratory changed? (Select one option)

Select one.

<input type="radio"/>	Improved	(Answer question number 15.1.)
<input type="radio"/>	Stayed about the same	(Answer question number 15.1.)
<input type="radio"/>	Declined	(Answer question number 15.1.)
<input type="radio"/>	Don't know	(Answer question number 15.1.)

15.1 Comments

16. Over the last year, how has your first year UK-educated undergraduates' ability to work independently in the laboratory changed? (Select one option)

Select one.

<input type="radio"/>	Improved	(Answer question number 16.1.)
<input type="radio"/>	Stayed about the same	(Answer question number 16.1.)
<input type="radio"/>	Declined	(Answer question number 16.1.)
<input type="radio"/>	Don't know	(Answer question number 16.1.)

16.1 Comments

17. Over the last year, how has your first year UK-educated undergraduates' level of knowledge changed? By 'knowledge' we mean familiarity with factual information about different topic areas within your subject. (Select one option)

Select one.

<input type="radio"/>	Improved	(Answer question number 17.1.)
<input type="radio"/>	Stayed about the same	(Answer question number 17.1.)
<input type="radio"/>	Declined	(Answer question number 17.1.)
<input type="radio"/>	Don't know	(Answer question number 17.1.)

17.1 Comments

18. Over the last year, how has your first year UK-educated undergraduates' level of understanding changed? By 'understanding' we mean a deep grasp of underpinning concepts and processes, not factual recall. (Select one option)

Select one.

<input type="radio"/>	Improved	(Answer question number 18.1.)
<input type="radio"/>	Stayed about the same	(Answer question number 18.1.)
<input type="radio"/>	Declined	(Answer question number 18.1.)
<input type="radio"/>	Don't know	(Answer question number 18.1.)

18.1 Comments

19. In which one area of those mentioned above has the greatest POSITIVE change occurred in the last year?

Select one.

<input type="radio"/>	New undergraduates' laboratory skills
<input type="radio"/>	New undergraduates' ability to plan experiments
<input type="radio"/>	New undergraduates' ability to work independently
<input type="radio"/>	New undergraduates' level of knowledge
<input type="radio"/>	New undergraduates' understanding

20. In which one area of those mentioned above has the greatest NEGATIVE change occurred in the last year?

Select one.

<input type="radio"/>	New undergraduates' laboratory skills
<input type="radio"/>	New undergraduates' ability to plan experiments
<input type="radio"/>	New undergraduates' ability to work independently
<input type="radio"/>	New undergraduates' level of knowledge
<input type="radio"/>	New undergraduates' understanding

21. How important do you think it is for new UK undergraduates to have any of these skills on entry to a university science degree? (Select one option per row)

Select one per row.

	<i>Very unimportant</i>	<i>Quite unimportant</i>	<i>Neither important nor unimportant</i>	<i>Quite important</i>	<i>Very important</i>
Confidence to work in a science laboratory	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Confidence to undertake experiments in an outdoor context	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to solve problems independently in a practical context	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to follow laboratory instructions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to understand laboratory and/or fieldwork instructions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to understand the theory behind the scientific method	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Competence in scientific methods and practices, specifically: Planning experiments	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Competence in scientific methods and practices, specifically: Use of scientific equipment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Competence in scientific methods and practices, specifically: Time management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Competence in scientific methods and practices, specifically: Note-taking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Competence in scientific methods and practices, specifically: Scientific report-writing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to use mathematical concepts and skills in a practical context, for example, for data analysis	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to follow laboratory Health and Safety regulations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to use IT tools in the laboratory or in the field, e.g. for making measurements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to use IT tools for analysing and presenting data obtained in own experiments	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Communication, team-working and presentation skills when working in a laboratory or in the field	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to use specialist laboratory and/or fieldwork equipment e.g. glassware in chemistry, an oscilloscope in physics or a microscope in biology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to apply specialist methods and techniques when carrying out experiments or fieldwork	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

21.1 Please add any other skills you think are important, with a brief explanation.

22. How well do you think your most recent first year UK-educated undergraduates are prepared for these skills? (Select one option per row)

Select one per row.

	<i>Not at all prepared</i>	<i>Somewhat unprepared</i>	<i>Neither prepared nor unprepared</i>	<i>Somewhat prepared</i>	<i>Very well prepared</i>	<i>Don't know</i>
Confidence to work in a science laboratory	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Confidence to undertake experiments in an outdoor context	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to solve problems independently in a practical context	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to follow laboratory instructions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to understand laboratory and/or fieldwork instructions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to understand the theory behind the scientific method	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Competence in scientific methods and practices, specifically: Planning experiments	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Competence in scientific methods and practices, specifically: Use of scientific equipment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Competence in scientific methods and practices, specifically: Time management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Competence in scientific methods and practices, specifically: Note-taking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Competence in scientific methods and practices, specifically: Scientific report-writing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to use mathematical concepts and skills in a practical context, for example, for data analysis	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to follow laboratory Health and Safety regulations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to use IT tools in the laboratory or in the field, e.g. for making measurements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to use IT tools for analysing and presenting data obtained in own experiments	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Communication, team-working and presentation skills when working in a laboratory or in the field	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Ability to use specialist laboratory and/or fieldwork equipment e.g. glassware in chemistry, an oscilloscope in physics or a microscope in biology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to apply specialist methods and techniques when carrying out experiments or fieldwork	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

22.1 Please add any other skills you think are important, with a brief explanation.

23. Has your undergraduate laboratory-based teaching changed over the past year in response to practical work skills of new first year undergraduates?

Select one.

<input type="radio"/>	Yes	(Answer question number 23.1.)
<input type="radio"/>	No	

23.1 If yes, please select all options that apply

Select all that apply.

<input type="checkbox"/>	Reduced the number of laboratory experiments
<input type="checkbox"/>	Increased the number of laboratory experiments
<input type="checkbox"/>	Removed complex experiments
<input type="checkbox"/>	Introduced complex experiments
<input type="checkbox"/>	Included detailed instructions on basic techniques
<input type="checkbox"/>	Reduced instructions on basic techniques
<input type="checkbox"/>	Changed curriculum content
<input type="checkbox"/>	Other: <input type="text"/>

24. Please add any additional comments about any aspect of this survey or about practical science.

Telephone interviews

As part of the study we would like to undertake brief telephone interviews with some respondents. You are asked to indicate below if you would be happy to participate. Your email address is required so that we can contact you about the interviews. Your details will not be used to identify you as part of the survey and will not be used for marketing purposes.

25. Please indicate below if you would be happy to undertake a brief telephone interview.

Select one.

<input type="radio"/>	Yes, I agree to participate in a brief telephone interview, if selected	(Answer question number 25.1.)
<input type="radio"/>	No, I do not wish to participate in a brief telephone interview	

25.1 If yes, please include your name and email address below

Student survey

As part of the study we would like to distribute a survey to undergraduate students. You are asked to indicate below if you would be happy to distribute the survey to your students. Your email address is required so that we can contact you about the student survey. Your details will not be used to identify you as part of the survey and will not be used for marketing purposes.

26. Please indicate below if you would be happy to distribute the survey to your students.

Select one.

<input type="radio"/>	Yes, I agree to distribute the student survey, if selected	(Answer question number 26.1.)
<input type="radio"/>	No, I do not wish to distribute the student survey	

26.1 If yes, please include your name and email address below.

4 Higher Education staff survey – Year 3

Practical Work in Science - Higher Education Staff Survey

Page 1

Science Practical Work Survey

We are seeking the views, opinions and experiences about practical work held by staff in Higher Education institutions within the United Kingdom who have a role teaching first year undergraduates in Biological Science, Chemistry and Physics laboratories. We estimate the survey will take around 15 minutes to complete.

The study is led by Durham University's School of Education and is funded by the Gatsby Charitable Foundation, with a contribution from the Wellcome Trust. The project is part of an on-going programme of work by Gatsby, Wellcome and the Nuffield Foundation to understand and improve practical work in science education. Findings from the survey will provide evidence for consideration by all organisations active in science and education in the UK.

Your institution name is requested in the survey to keep track of participating institutions over the three-year period, but these will not be identified in any report. Although stating your name is optional, it would be very helpful if you would provide this to enable investigation of changes over time. All information given to us, including all personal details, will be treated in the strictest of confidence in accordance with the Data Protection Act. The survey responses and results (with all personally identifiable information removed) will be made freely available at the end of the study, and will help researchers, funders, and policy makers to understand the views about practical work in science in the UK. When the survey responses and results of the study are published, your answers will be included with data provided by other people, no individual or institution will be identifiable from the research findings. The study has ethical clearance from Durham University's School of Education Research Ethics Committee and is conducted in accordance with British Educational Research Association (2011) guidelines. Participants are completing the survey on a voluntary basis and may withdraw at any time.

Practical work is a long-standing component of science education. Thank you for your help in documenting how science practical work is delivered and any changes occurring over the

lifetime of the study.

If you have any queries or comments about the survey or study as a whole, please contact research@cem.dur.ac.uk.

Many thanks for your support of the study.

Vanessa Kind, Helen Cramman, Kirsty Younger, Helen Gray and Paivi Eerola

Durham University School of Education

To start the survey, click on the "Next" button below. Please note that clicking on the "Next" button below indicates that you consent to participating in the survey based on the information given on this page.

Page 2: About you

1. Your first name

2. Your last name

3. Name of university * *Required*

4. In which nation is your university? * *Required*

- ☐ England
- ☐ Northern Ireland
- ☐ Scotland
- ☐ Wales

5. In which department(s) do you teach? Select all applicable options. * *Required*

Please select at least 1 answer(s).

- ☐ Biological Science (including Life Sciences, Plant Biology and Animal Sciences)
- ☐ Chemistry

- ☐ Physics (including Astronomy)
- ☐ Other

5.a. If you selected Other, please specify:

6. What is your role within the department in which you work for the largest proportion of your working week? Select all that apply. * *Required*

Please select at least 1 answer(s).

- ☐ First year undergraduate laboratory coordinator
- ☐ First year undergraduate course director
- ☐ Laboratory demonstrator (academic member of staff e.g. lecturer, teaching fellow, PDRA)
- ☐ Admissions tutor
- ☐ Other

6.a. If you selected Other, please specify:

7. For how many years have you taught undergraduate students? *Enter a number (Minimum 0, Maximum 60).*

Please enter a whole number (integer).

Page 3: About your department

What are the standard entry requirements for undergraduates to study a single honours science degree in your department?

8. Grades / UCAS points tariff required for entry in Autumn 2017 (e.g. SQA Highers: AAAA, A Levels: AAA, IB: 37 points with 655 at HL).

9. Subjects required (e.g. Grade A in Mathematics, Advanced Higher in Biology etc.).

10. Have entry requirements changed over the last five years? Select one option.

- ☐ Increased
- ☐ Decreased
- ☐ Stayed the same
- ☐ Don't know
- ☐ Other

10.a. If you selected Other, please specify:

11. Do you currently take account of applicants' Extended Project Qualifications (EPQ) or CREST Award/Nuffield Research Placement experience in your entry requirements?

- ☐ Yes
- ☐ No
- ☐ Don't know

12. Do you currently assume that a good grade in A Levels, SQA Highers, IB (or equivalent) reflects a level of practical skill which will enable the student to fully access the course for which s/he has applied?

- ☐ Yes
- ☐ No
- ☐ Don't know

13. Do you require a pass in a practical endorsement as part of your offers alongside science A Levels, SQA Highers, IB (or equivalent) grades?

- ☐ Yes
- ☐ No
- ☐ Don't know

13.a. If yes, please provide details:



Page 4: Undergraduate skills

14. Compared with last academic year's cohort, how has your first year UK-educated undergraduates' level of laboratory skills changed? By 'laboratory skills' we are referring to their ability to work with apparatus effectively. Experiment planning, data analysis and simulations are excluded from this definition. Select one option.

- ☐ Improved
- ☐ Stayed about the same
- ☐ Declined
- ☐ Don't know

14.a. Comments, thinking particularly about first year undergraduates who have studied A levels in England:

15. Compared with last academic year's cohort, how has your first year UK-educated undergraduates' ability to plan experiments in the laboratory changed? Select one option.

- ☐ Improved
- ☐ Stayed about the same
- ☐ Declined
- ☐ Don't know

15.a. Comments, thinking particularly about first year undergraduates who have studied A levels in England:

16. Compared with last academic year's cohort, how has your first year UK-educated undergraduates' ability to work independently in the laboratory changed? Select one option.

- ☐ Improved
- ☐ Stayed about the same
- ☐ Declined
- ☐ Don't know

16.a. Comments, thinking particularly about first year undergraduates who have studied A levels in England:

17. Compared with last academic year's cohort, how has your first year UK-educated undergraduates' level of knowledge changed? By 'knowledge' we mean familiarity with factual information about different topic areas within your subject. Select one option.

- ☐ Improved
- ☐ Stayed about the same
- ☐ Declined

☐ Don't know

17.a. Comments, thinking particularly about first year undergraduates who have studied A levels in England:

18. Compared with last academic year's cohort, how has your first year UK-educated undergraduates' level of understanding changed? By 'understanding' we mean a deep grasp of underpinning concepts and processes, not factual recall. Select one option.

- ☐ Improved
- ☐ Stayed about the same
- ☐ Declined
- ☐ Don't know

18.a. Comments, thinking particularly about first year undergraduates who have studied A levels in England:

19. In which one area of those mentioned above has the greatest positive change occurred in the last year?

- ☐ New undergraduates' laboratory skills
- ☐ New undergraduates' ability to plan experiments
- ☐ New undergraduates' ability to work independently
- ☐ New undergraduates' level of knowledge
- ☐ New undergraduates' understanding

20. In which one area of those mentioned above has the greatest negative change occurred in the last year?

- ☐ New undergraduates' laboratory skills
- ☐ New undergraduates' ability to plan experiments
- ☐ New undergraduates' ability to work independently
- ☐ New undergraduates' level of knowledge
- ☐ New undergraduates' understanding

Page 5: Importance of skills on entry

21. How important do you think it is for new UK undergraduates to have any of these skills on entry to a university science degree? Select one option per row.

	Very unimportant	Quite unimportant	Neither important nor unimportant	Quite important	Very important
Confidence to work in a science laboratory	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Confidence to undertake experiments in an outdoor context	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to solve problems independently in a practical context	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to follow laboratory instructions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to understand laboratory and/or fieldwork instructions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to understand the theory behind the scientific method	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Competence in scientific methods and practices, specifically: Planning experiments	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Competence in scientific methods and practices, specifically: Use of scientific equipment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Competence in scientific methods and practices, specifically: Time management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

21.a. How important do you think it is for new UK undergraduates to have any of these skills on entry to a university science degree? Select one option per row.

	Very unimportant	Quite unimportant	Neither important nor unimportant	Quite important	Very important
Competence in scientific methods and practices, specifically: Note-taking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Competence in scientific methods and practices, specifically: Scientific report-writing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to use mathematical concepts and skills in a practical context, for example, for data analysis	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to follow laboratory Health and Safety regulations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Ability to use IT tools in the laboratory or in the field, e.g. for making measurements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to use IT tools for analysing and presenting data obtained in own experiments	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Communication, team-working and presentation skills when working in a laboratory or in the field	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to use specialist laboratory and/or fieldwork equipment e.g. glassware in chemistry, an oscilloscope in physics or a microscope in biology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to apply specialist methods and techniques when carrying out experiments or fieldwork	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

21.b. Please add any other skills you think are important, with a brief explanation.

Page 6: Preparedness of students on entry

22. How well do you think your most recent first year UK-educated undergraduates are prepared for these skills? Select one option per row.

	Not at all prepared	Somewhat unprepared	Neither prepared or unprepared	Somewhat prepared	Very well prepared	Don't know
Confidence to work in a science laboratory	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Confidence to undertake experiments in an outdoor context	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to solve problems independently in a practical context	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to follow laboratory instructions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to understand laboratory and/or fieldwork instructions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to understand the theory behind the scientific method	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Competence in scientific methods and practices, specifically: Planning experiments	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Competence in scientific methods and practices, specifically: Use of scientific equipment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Competence in scientific methods and practices, specifically: Time management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

22.a. How well do you think your most recent first year UK-educated undergraduates are prepared for these skills? Select one option per row.

	Not at all prepared	Somewhat unprepared	Neither prepared or unprepared	Somewhat prepared	Very well prepared	Don't know
Competence in scientific methods and practices, specifically: Note-taking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Competence in scientific methods and practices, specifically: Scientific report-writing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to use mathematical concepts and skills in a practical context, for example, for data analysis	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to follow laboratory Health and Safety regulations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to use IT tools in the laboratory or in the field, e.g. for making measurements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to use IT tools for analysing and presenting data obtained in own experiments	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Communication, team-working and presentation skills when working in a laboratory or in the field	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to use specialist laboratory and/or fieldwork equipment e.g. glassware in chemistry, an oscilloscope in physics or a microscope in biology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to apply specialist methods and techniques when carrying out experiments or fieldwork	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

22.b. Please add any other skills you think are important, with a brief explanation.

23. Has your undergraduate laboratory-based teaching changed since last academic year in response to practical work skills of new first year undergraduates?

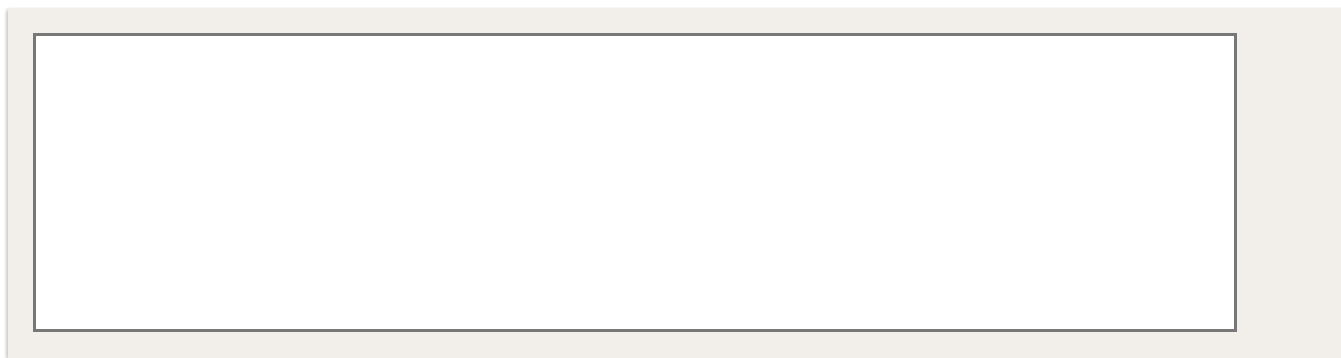
- ☐ Yes
- ☐ No

23.a. If yes, please select all options that apply.

- ☐ Reduced the number of laboratory experiments
- ☐ Increased the number of laboratory experiments
- ☐ Removed complex experiments
- ☐ Introduced complex experiments
- ☐ Included detailed instructions on basic techniques
- ☐ Reduced instructions on basic techniques
- ☐ Changed curriculum content
- ☐ Other

23.a.i. If you selected Other, please specify:

24. We are particularly interested in any additional comments that you may have about how well schools and colleges are preparing students for practical work in science at university. This is especially important for us to capture in the last year of the study and in the context of the recent changes to A Levels in England.



Page 7: Telephone interviews

As part of the study we would like to undertake brief telephone interviews with some respondents. You are asked to indicate below if you would be happy to participate. Your email address is required so that we can contact you about the interviews. Your details will not be used to identify you as part of the survey and will not be used for marketing purposes.

25. Please indicate below if you would be happy to undertake a brief telephone interview.

- ☐ Yes, I agree to participate in a brief telephone interview, if selected
- ☐ No, I do not wish to participate in a brief telephone interview

25.a. If yes, please include your name and email address below.

Student Survey

As part of the study we would like to distribute a survey to some undergraduate students. You are asked to indicate below if you would be happy to distribute the survey, via a weblink to your students. Your email address is required so that we can contact you about the student survey. Your details will not be used to identify you as part of the survey and will not be used for marketing purposes.

26. Please indicate below if you would be happy to distribute the survey to your students.

- ☐ Yes, I agree to distribute the student survey, if selected
- ☐ No, I do not wish to distribute the student survey

26.a. If yes, please include your name and email address below.

Page 8: Thank you

If you have any queries or comments about the survey or study as a whole, please contact research@cem.dur.ac.uk.

Monitoring Practical Science in Schools and Colleges

Version 1.0

Publication date: January 2019

ISBN: 978-0-907552-19-2